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ABSTRACT

Designed for adult basic education students at the grade 4, 5, or 6 level, this student workbook and accompanying instructor's guide (separate document) comprise the Adult Basic Education Level III package on the metric system. The content of this workbook is occupationally oriented. (There are references to measurement tasks used within 31 different occupations.) Each of the five activity sections (linear, area, mass, volume and capacity, and temperature) uses a problem solving approach to the metric system and presents hands-on activities which introduce appropriate concepts, measurement words, and measurement devices. Supplementary diagrams and charts are included. (SH)

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ED142695

Metrics for Good Measure

LEVEL II. STUDENT WORKBOOK.

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Doris J. Kreitlow
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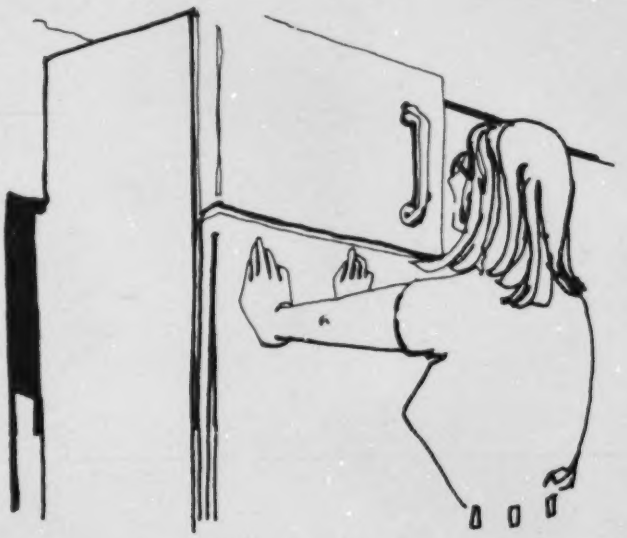
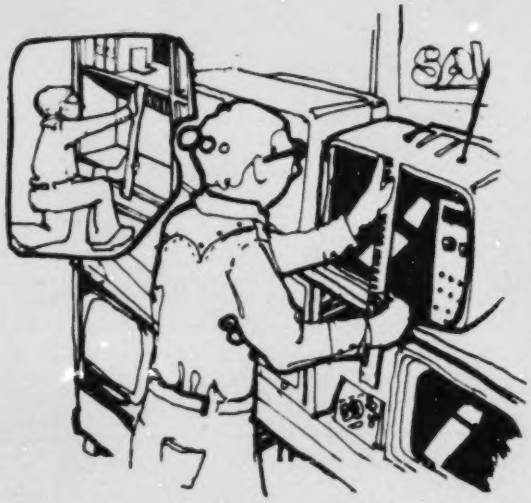
METRIC MEASUREMENT

We need to measure something almost every day. If we make a pot of coffee we are measuring. When we listen to the weather report, we are responding to measures. If we count calories we are using measures.

If we don't take time to measure we may have problems. For example, the woman in the picture has a real problem. She just bought a refrigerator. It's too high for the space where it should go. What could she have done to prevent this problem?



There were two things she should have measured before she bought the refrigerator. She should have measured the space where she was going to put it. Then she should have measured the refrigerator at the store. The second picture shows her measuring the height of the refrigerator.

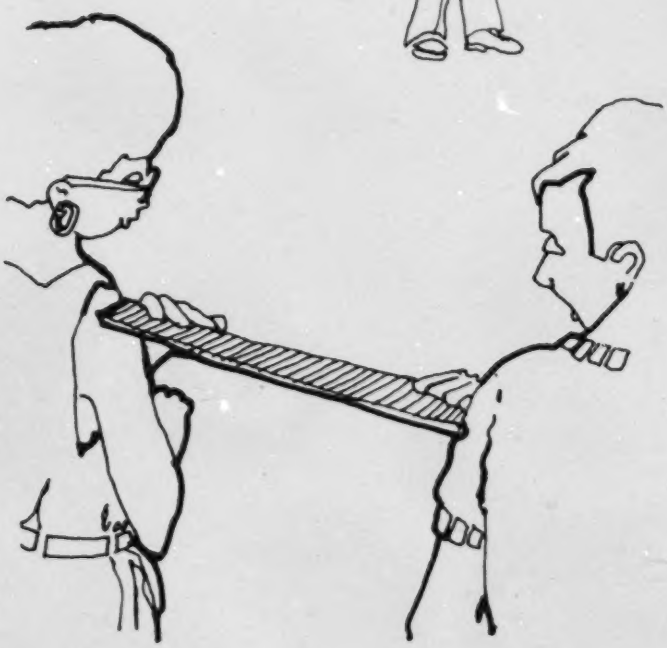


This person planned ahead. He has a place where he wants to put a television set. He measured the height of the space and of the TV he wants to buy. Since he measured the space, he knows if it will fit.

These people did not plan ahead. The sofa will not fit through the door. It is too wide for the doorway. What should they have done before they tried to move the sofa through the doorway?

These are some of the times when people need to measure. You can probably think of things you measure at home, at work, and at play.

More and more companies are using the metric system when they measure. In a few years everyone will have to know it. The metric system is easy to learn and easy to use. When you turn the page you will begin using the metric system. The more you use it the better you will know it. Pretty soon you will even begin to THINK METRIC!



METRES

Doing Metric Activities

Activity 1. A METRE HIGH

Go to the resource table. Pick up one of the metre sticks. Stand the stick up on the floor. Hold it in place with one hand. Walk around the stick. Now stand next to the stick. With your other hand, touch yourself at the top of the metre stick. This is how high a metre is.

Activity 2. A METRE LONG

Pick up the metre stick again. Hold one arm out straight at shoulder height. Put the metre stick along this arm until the end hits the tip of your fingers. Where is the other end of the metre stick? Touch yourself at that end. This is how long a metre is. Try to remember the length of a metre.

Activity 3. A METRE WIDE

Choose a partner. Stand beside each other. Move apart so that you can put one end of a metre stick on your partner's shoulder and the other end of the metre stick on your shoulder. Look at the space between you. This is the width of a metre. Move away from your partner. Walk around the room. Now see if you and your partner can come back together and stand so that you are a metre apart. Check with a metre stick. Find a new partner and see if you two can stand a metre apart.

Activity 4. METRE ROOM

Find a partner. Each of you get a metre stick. Measure the length of the room in metres. Write the length on a piece of paper. Write the letter m for the word metre. If the room is five metres long, write 5 m. Now measure the width of the room in metres. Can you find the height of the room?

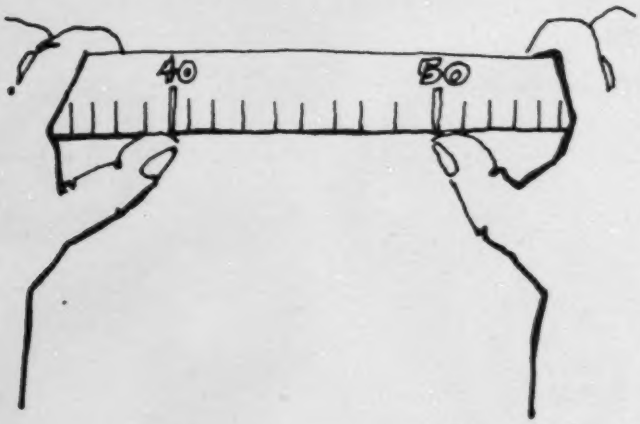
Activity 5. STEPPING METRES

Go out in the hall. Mark a spot on the floor with a piece of chalk or tape. Measure 10 metres down the hall and mark that spot. You now have two marks on the floor and they should be 10 metres apart. Now walk from one mark to the other. How many steps did you take? Keep trying until you take the same number of steps each time.

Activity 6. METRES AROUND THE ROOM

Take your metre stick and measure some big things in the room. Before you measure guess if each object is shorter or longer than a metre. You might measure the height of the doorknob from the floor. How high are you? How long is a table? How high is the window?...the door? How wide is the window?...the table? Guess and then measure. How close were your guesses to the actual measures? (You may want to do this again after you finish Activity 9.)

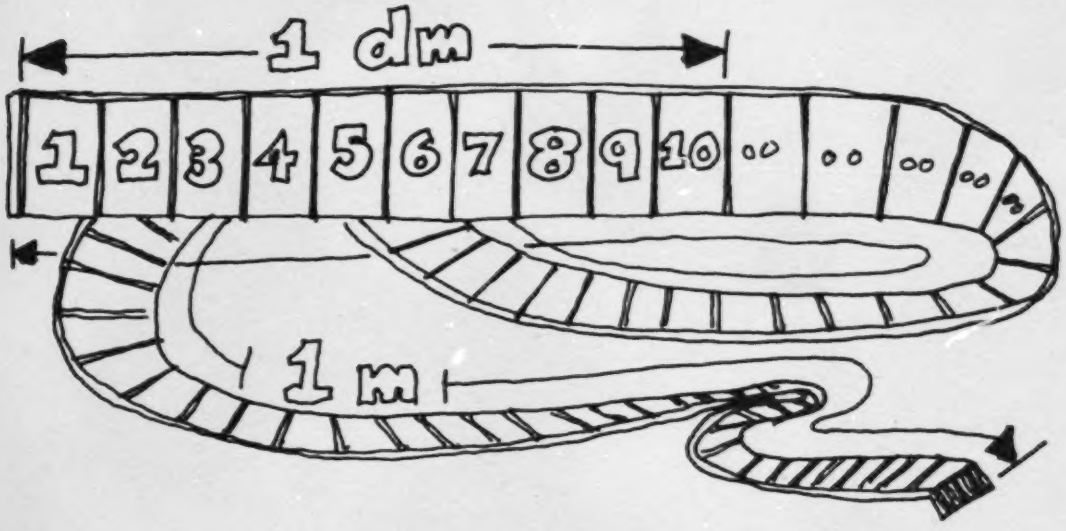
DECIMETRES



Sometimes a metre is too big for what we want to measure. When that is so we use a part of a metre. One way of using a part of a metre is by dividing a metre into 10 equal parts. This smaller part is called a decimetre.

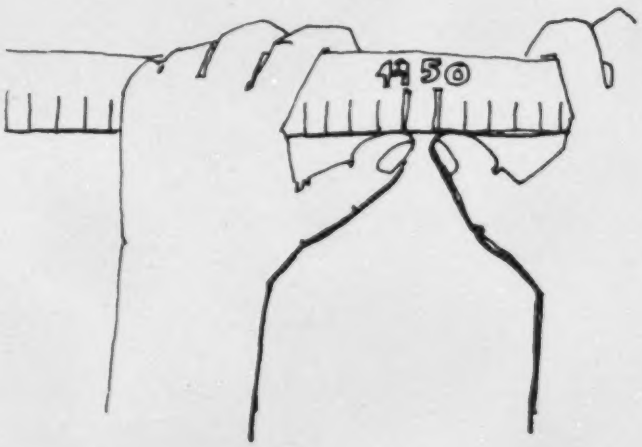
Take a metre stick. Put one thumb on the number 40 and the other thumb on the number 50. Your thumbs are a decimetre apart.

You can get another idea of a decimetre by looking at the picture here. Beside the closer end of the wavy metre is a section that is one decimetre long. How many decimetres are there in one metre? Check your answer with the answer on page 60.

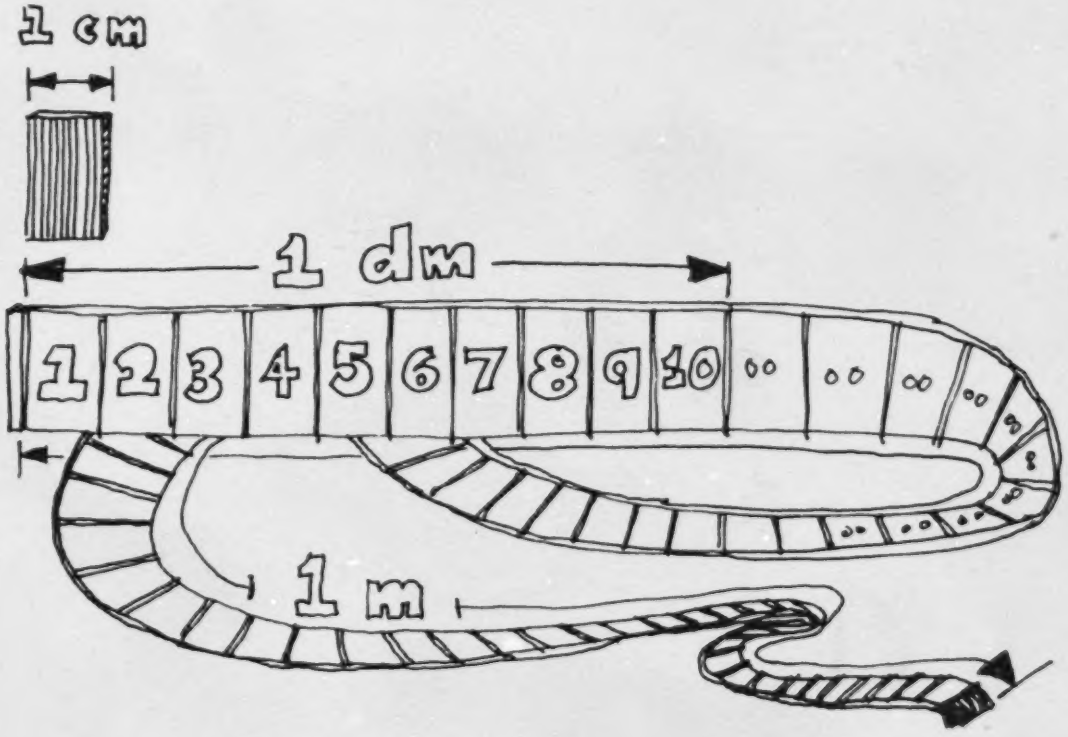


CENTIMETRES

We can divide a metre into even smaller parts. If a decimetre is cut into 10 equal parts, each part is a centimetre. Take your metre stick and put one thumb at the number 49. Put the other thumb at the number 50. Your thumbs are one centimetre apart.

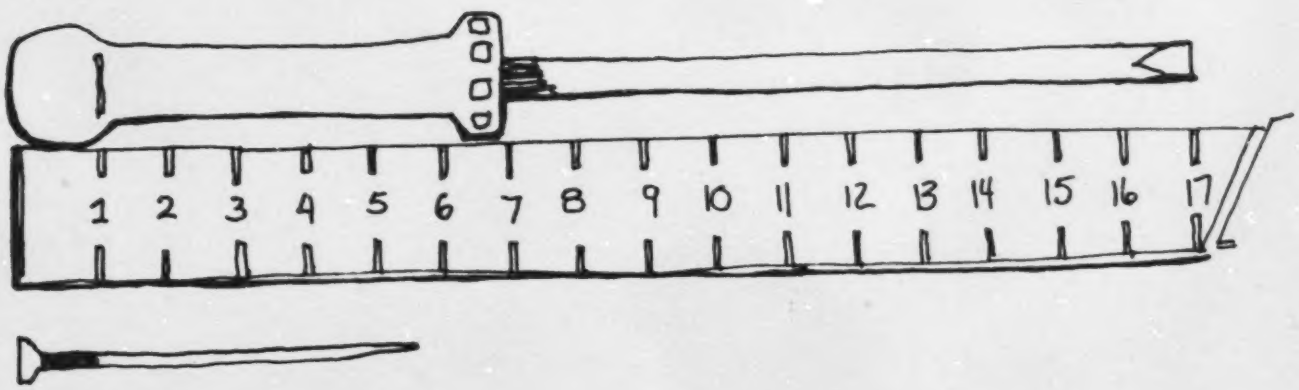


You can get another idea of the size of a centimetre in the picture below. This picture shows a metre, a decimetre, and a centimetre. The symbol cm means centimetre. How many centimetres are there in one decimetre? How many centimetres are there in one metre? Check your answers with the ones given on page 60.



Look at the picture of the screwdriver next to the ruler. One end of the screwdriver is at the end of the ruler near the number 1. The other end of the screwdriver is at the 17 mark. This means that the screwdriver is 17 cm long.

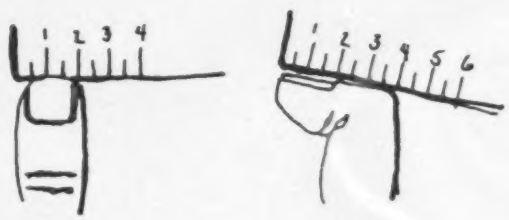
Look at the picture of the nail next to the centimetre ruler. One end of the nail is at the end of the ruler near the number 1. The other end of the nail is between the 5 mark and the 6 mark. This means that the nail is between 5 cm and 6 cm long. Is the end of the nail closer to the 5 mark or the 6 mark? It is closer to the 6 mark so we would say that the nail is about 6 cm long.



Doing Metric Activities

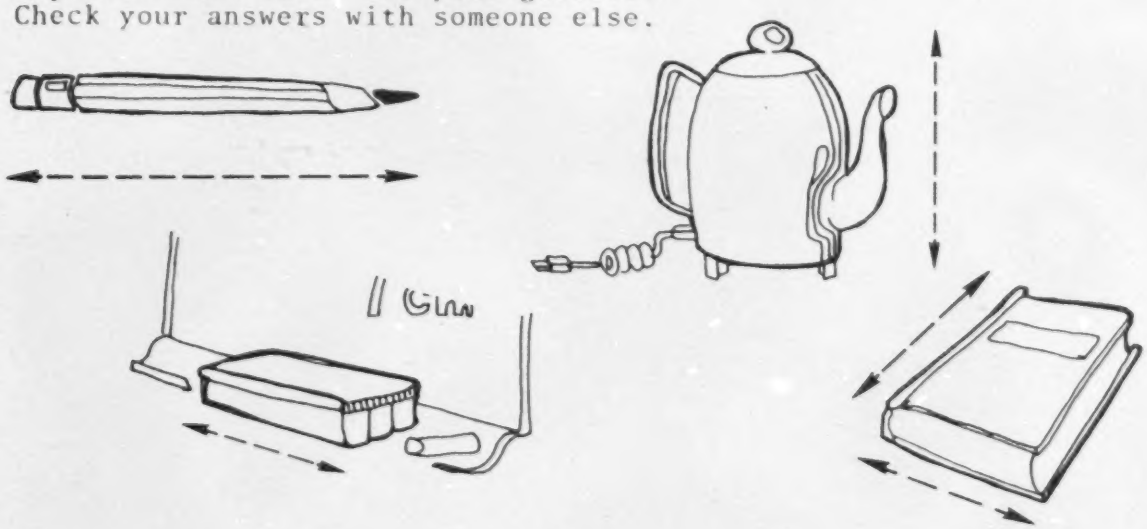
Activity 7. CENTIMETRES

Go to the resource table and pick up a metric ruler. Put the ruler across the nail of your index finger. How wide is your index fingernail? Bend your thumb at the first joint. Measure this with the ruler. How long is it? Measure the width of the palm of your hand with the ruler. How wide is the palm of your hand? Write your answers on a piece of paper. Compare your answers with another person.



Activity 8. GUESS AND MEASURE

Use your ruler to measure the objects on the resource table. You should find a pencil, an eraser, a coffee pot, and a book. Guess the length of the objects before you measure. Write your guess on a piece of paper. Use cm for the word centimetres. Now measure the objects. How close are your guesses? Check your answers with someone else.



Activity 9. METRIC TAPE MEASURE

A metric tape measure is 150 cm long and made out of cloth or soft plastic. Use a metric tape measure to measure yourself. Measure your waist, your hips, and your chest. Compare these measurements with the Butterick Pattern Measurement Chart. What size pattern would you buy? Check with your teacher to see if you have the right pattern size. Also measure the distance around your thumb, the distance around your neck, and the length of your shoe.

Activity 10. BODY MEASUREMENTS

Fill in the measurements for a man, a woman, and a child or large doll. Use the next page to write your answers. Be sure to put the symbol cm after each measurement to show that this answer is in centimetres.

BODY MEASUREMENTS

A Man

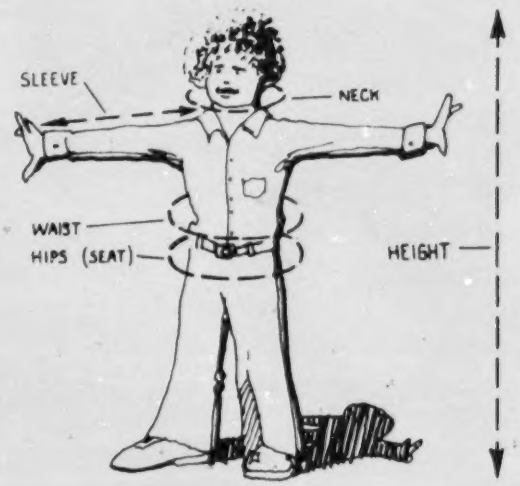
Height _____

Waist _____

Neck _____

Hip (Seat) _____

Sleeve _____



A Woman

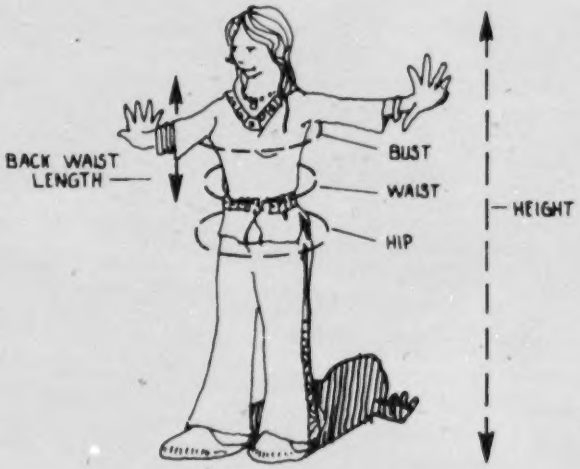
Height _____

Bust _____

Hip _____

Waist _____

Back Waist Length _____



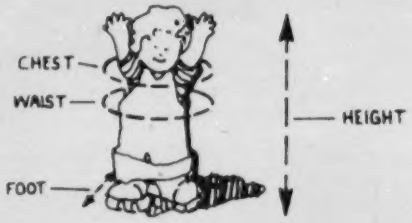
A Small Child

Height _____

Chest _____

Waist _____

Foot _____

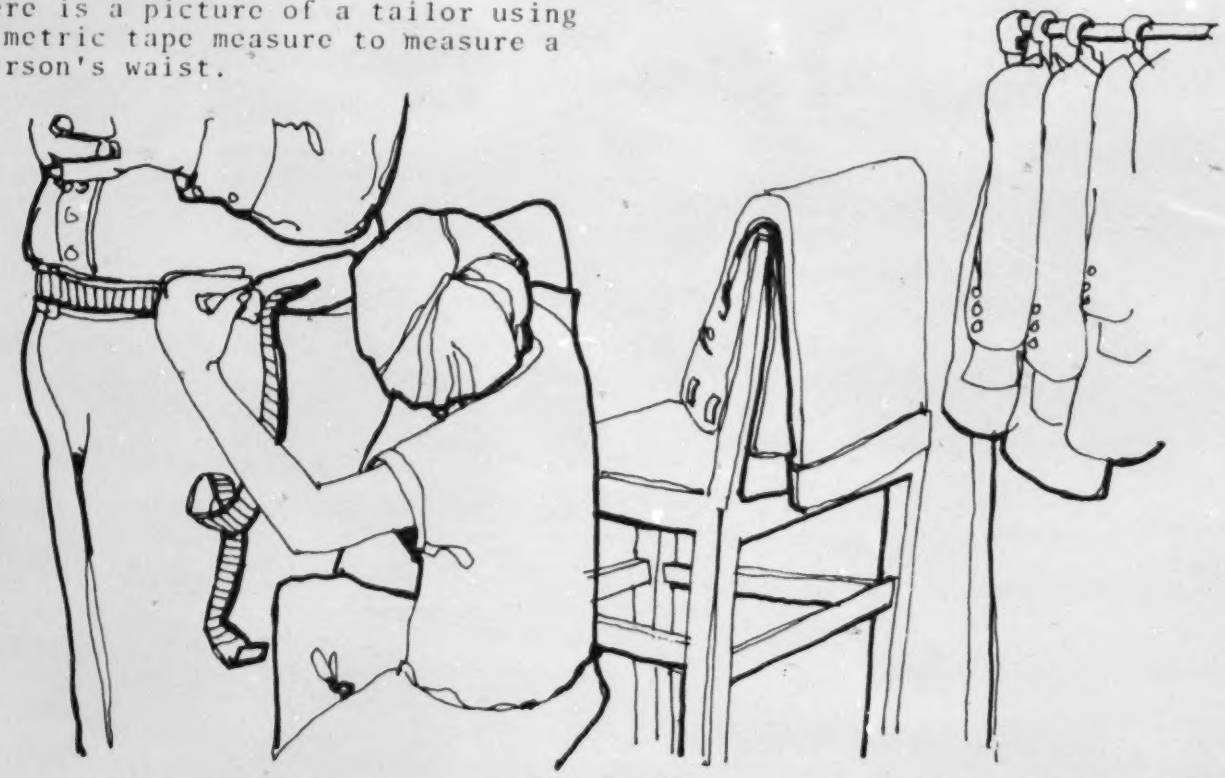


Using Metrics at Work

People use centimetres to measure lots of things in their work. Here is a picture of a shoe clerk measuring a child's foot. The foot is being measured in centimetres. The clerk will then know the correct shoe size for the child.

Here is a picture of a man trying on a suit. The sleeves are too long. The tailor is measuring the sleeve with a centimetre ruler. This will tell the tailor how many centimetres to shorten the sleeve.

Metre sticks and rulers are not easy to use if you want to find out how big your waist is. Tailors and sales clerks in clothing stores use metric tape measures. Because a metric tape measure is 150 cm long, it is one and one-half metres long. Here is a picture of a tailor using a metric tape measure to measure a person's waist.

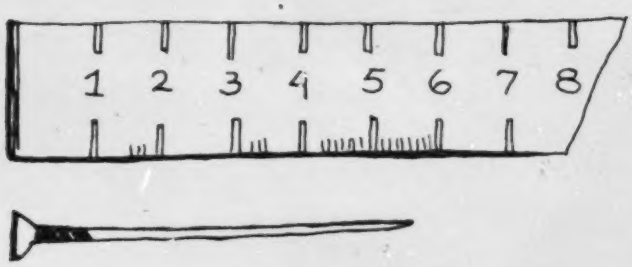


MILLIMETRES

There is one other small metric unit that people use for measuring. This is called a millimetre. There are 10 millimetres in one centimetre. There are 100 centimetres in one metre. There are 10 decimetres in one metre.

Doing Metric Activities

Activity 11. MEASURING MILLIMETRES



Go to the resource table and get a metric ruler. Each of the marks on the ruler is for a millimetre. To help you measure, the centimetres have been numbered. Remember that each centimetre is ten millimetres. Look at the picture of the nail next to the ruler. One end of the nail is at the end of the ruler near the number 1. The other end of the nail is between the 5 mark and the 6 mark. This means that the nail is between 50 mm and 60 mm long. Now count the small line markings from the 5 to the end of the nail. Did you count 7 lines? This means that the nail is 57 mm long.

Activity 12. MILLIMETRES

Go to the resource table and measure the thickness of each of the following: a paper clip wire and a dime. How thick are they? They should both be about 1 mm thick. Measure the thickness of your fingernail.

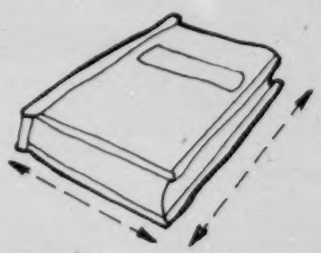
Activity 13. ME IN MILLIMETRES

Measure some parts of yourself in millimetres. Write down the measures that you find. Be sure to use the symbol mm. Measure your little finger. How long is your little finger? How wide? Measure your longest finger. How long is that finger? How wide? Compare your measurements with other people in class.

Activity 14. MORE MILLIMETRES

Go to the resource table. Guess the length of the following things: paper clip, button, needle, bolt, stapler, pencil, book, and the table. Also, guess the width of the table and of the book. Write all your guesses on a sheet of paper.

Now measure each of these objects. How close were your guesses?



Activity 15. UP IN SMOKE

Measure the lengths of the cigarettes on the resource table. Is the 100 mm cigarette really 100 mm? What about the 120 mm cigarette? How long is the other cigarette?

Activity 16. MILLIMETRES AND CENTIMETRES

Pick up a 100 mm cigarette. How many centimetres long is it? So, 100 mm = ____cm. Measure a 120 mm cigarette in centimetres. 120 mm = ____cm. Check your answers with the ones given on page 60.

Measure the toothbrush on the resource table. It is ____mm or ____cm long.

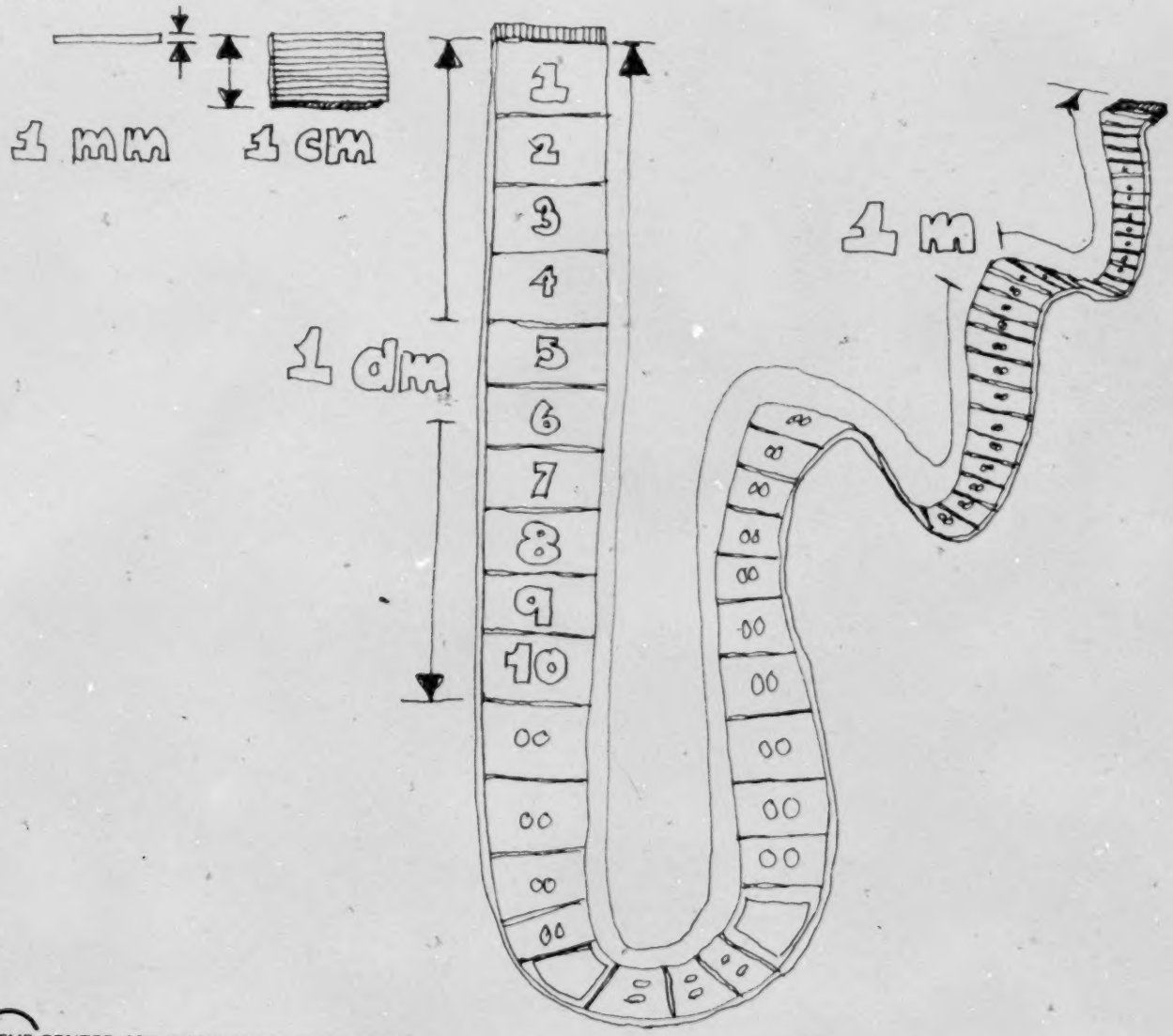
Look at the picture of the nail in Activity 11. The nail is 57 mm long. This is 5 cm and 7 mm. Since there are 10 mm in each cm, 1 mm = 0.1 cm (one tenth of a centimetre). So, 7 mm = 0.7 cm and 57 mm = 5.7 cm.

Measure the length of the paper clip. It is 34 mm. This is the same as 3 cm and ____mm. Since there are 10 mm in one cm, each millimetre is 0.1 cm. So, 4 mm = ____cm. The paper clip is 34 mm or 3.4 cm long.

Measure the toothpick. It is ____mm or ____cm long.

Using Metrics at Work

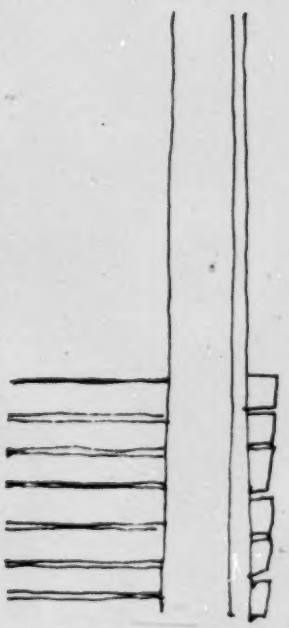
The picture here shows a millimetre next to a centimetre. It also shows a decimetre and a metre. People will use millimetres to measure many things. In fact, most measures will be in millimetres or metres. Centimetres mostly will be used to measure people and their clothes.



Some people who will use millimetres in their work are plumbers. Here we see a plumber measuring a pipe. Before another pipe will fit this pipe it must be the right size. The plumber is measuring the diameter of the pipe in millimetres.

Hems in clothes are measured in millimetres. In this picture a tailor is hemming a dress. The tailor is measuring the hem in millimetres.

Small objects are not the only things that are measured in millimetres. The carpenter in the picture is looking over a supply of lumber. One set of boards is 40 mm wide by 90 mm long. Another set of boards is 20 mm by 140 mm. Sheets of plywood and plasterboard are 1200 mm by 2400 mm. Most doors are 2100 mm high.



KILOMETRES

So far we have worked with metres and smaller parts of metres--centimetres and millimetres. The kilometre is a unit larger than the metre. There are 1000 metres in a kilometre. The symbol km is used for kilometre.

Doing Metric Activities

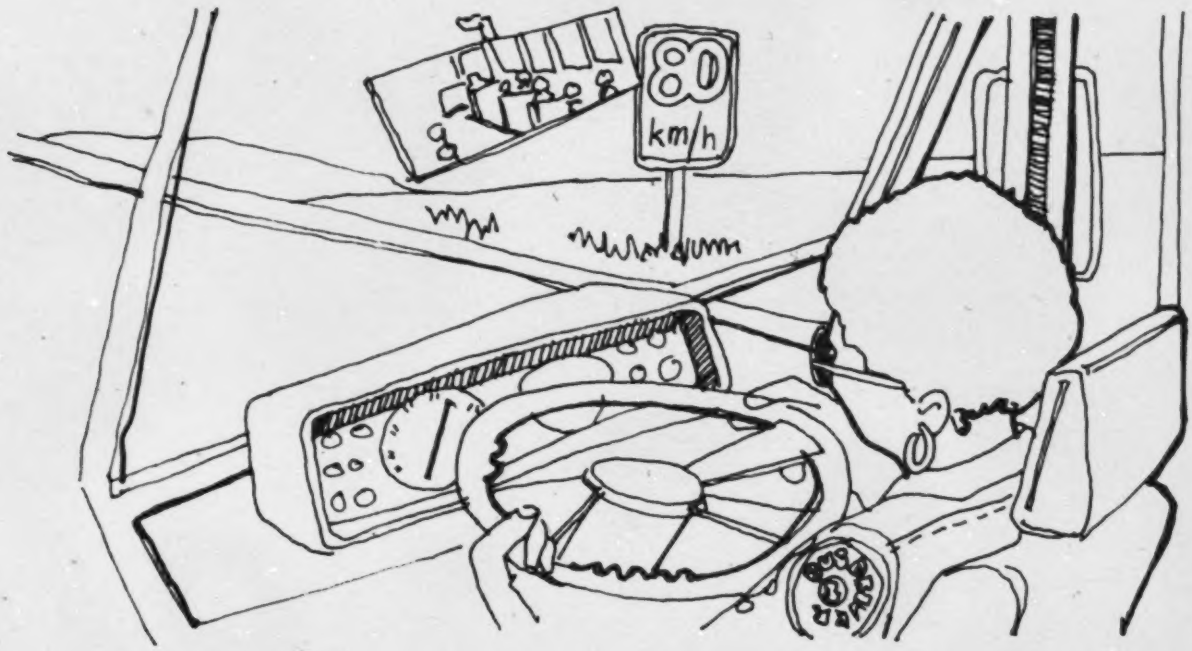
Activity 17. STEPPING KILOMETRES

How far is a kilometre? Remember Activity 5 where you stepped off 10 metres? If each step is one metre, then 1000 steps would be one kilometre. Step off some distances and see if they are a kilometre. How far is it around your block? How far is it from class to where you live? If you walk, count the number of steps. 1000 steps is 1 km, 2000 steps is 2 km, 2500 steps is 2.5 km, 1428 steps is 1.428 km. Walk to several places from where you live. Count the steps and then write the distance in kilometres. Is there any place that is exactly one kilometre from where you live?

Using Metrics at Work

When you want to know how far it is from one place to another, you give that distance in kilometres. When you want to know how fast a car is going you give that speed in kilometres per hour. The symbol km is used for kilometres. The symbol km/h is used for kilometres per hour.

Here is a bus driver driving her bus down the highway. The speed limit is on the sign. It says that the speed limit is 80 km/h, or 80 kilometres per hour. The speedometer tells us how fast the bus is going.



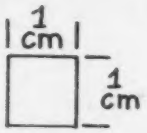
Along the highway there are signs that tell how far it is to the next city. The sign in this picture says that it is 15 kilometres to Downtown. Some signs will have the word kilometre. This sign used the symbol km.

Who else needs to know the number of kilometres it is from one place to another? Truck drivers, pilots, police, fire fighters, and taxi drivers are some of the people who need to know distances in kilometres. How many jobs can you think of where people need to use kilometres? Discuss this with others in your class.

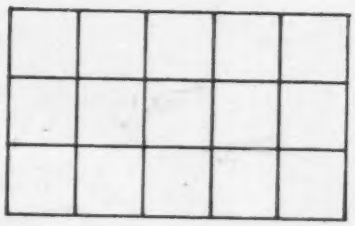
AREA

SQUARE CENTIMETRES

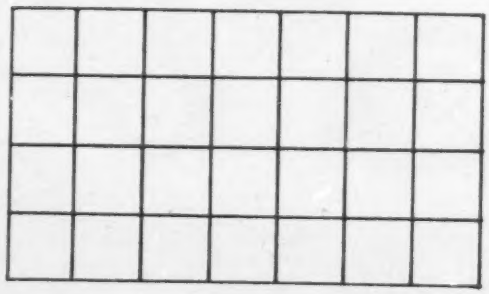
Here is a square centimetre. It measures 1 cm by 1 cm. The symbol for square centimetre is cm^2.



Now look at the rectangle. It measures 5 cm by 3 cm. It has been divided into square centimetres. How many square centimetres are there in this rectangle? Count them and you should get 15. We say that the area of this rectangle is 15 square centimetres, and we write it 15 cm^2.



Look at the next rectangle. It is 4 cm by 7 cm. What is the area of this rectangle? There are two ways you can find out. One way is to count the number of square centimetres that are in the rectangle. Another way is to see that there are 4 rows with 7 squares in each row. Four rows of seven is 7 + 7 + 7 + 7, or 4 x 7. Both ways you should get the same answer--28 cm^2. Area is always given in square units. So do not forget to put the correct symbol for area after the number.

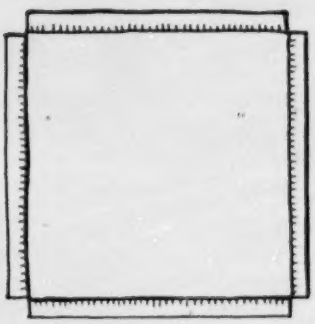


SQUARE METRES

Many people will not use square centimetres in their work. They will use a much larger unit--a square metre. How big is a square metre? You will get an idea of the size of a square metre in the Doing Metric Activities section.

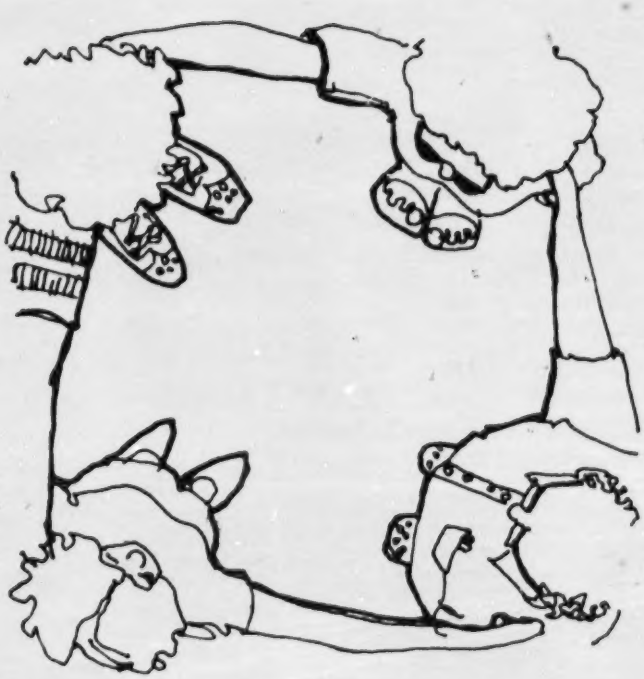
Doing Metric Activities

Activity 18. SQUARE METRES



Get together with three partners. There should be four people in your group. Take four metre sticks and form a square. Put the sticks together on the floor so that they touch only at the corners. The square should look something like the one pictured here. The space inside the square is one square metre. Look around the room. Do you see anything that looks as if it has an area of one square metre?

Activity 19. LIVING METRES



Do you remember how long a metre is? You and your three partners get together again. Stand facing each other, and form a square. Hold your right arm out straight at shoulder length. Touch yourself with your left hand so that the length from the end of your right hand to your left hand is one metre. Have the partner on your left touch you with her right hand at the place where you have your left hand. You touch the partner on your right with your right hand where he has his left hand. Keep going until every partner is touching another partner. Now look at the space the four of you have formed. This space should be a square metre.

Activity 20. METRIC ROOM

In Activity 4 you measured the length and width of the room in metres. What is the area of the floor in square metres? How many square metres of carpeting would it take for this room? You also measured the height of the room. Find the area of each wall in square metres. Find the total area of all the walls in the room. How many square metres of wallpaper would it take to paper this room? What did you do about the windows and doors? Did you subtract their areas when you found the area of a wall?

Wallpaper hangers must know how much wallpaper to buy for the walls of a room. To do that they have to know certain things. They have to find the area of the walls of the room. They must know how often the pattern in the paper repeats. They have to know the width of the wallpaper. And they need to know the height of the wall space to be covered.

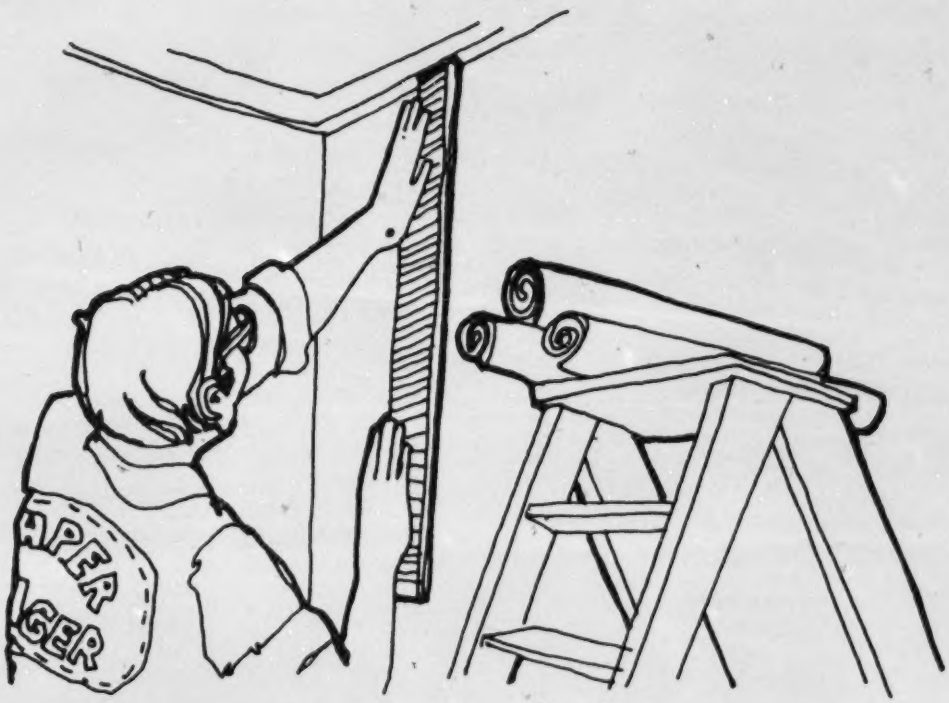
Using Metrics at Work

Where do people use square metres in their work? The next few pictures should give you an idea of some of the people who use square metres in their work.

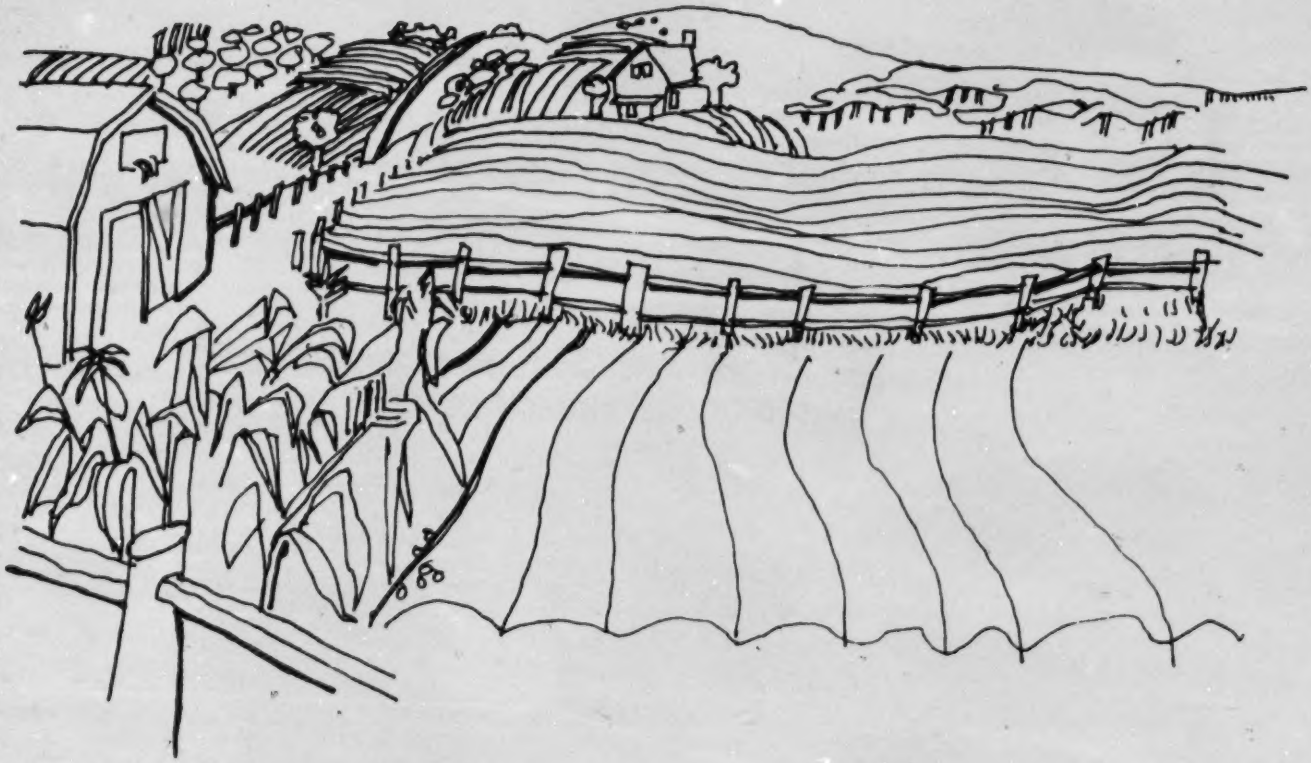
People who sell carpets use square metres. In the first picture, the sales clerk is helping someone pick the carpet the person wants. The price of the carpet is $9.00 for each square metre ($9/m²). Before the clerk can complete the sale, she needs to know how much carpeting will be needed. One way to do this is to measure the place to be carpeted.

In the second picture the sales clerk has gone to measure the room. If the room is a rectangle, then all she needs to measure is the length and the width. If she measures the length and width of the room in metres, and multiplies these numbers, she will find the area in square metres (m^2).

Other people use square metres when they work. For example, this wallpaper hanger is measuring the wall so he will know how many rolls of paper to order. Rolls of wallpaper come in many widths. But, each roll has the same number of square metres of wallpaper. One thing the paper hanger needs to know is the area of the walls in square metres.



There is an even bigger unit for area. This unit is the hectare, and it is used for measuring land. A hectare has an area of 10 000 m^2. This farm land would be measured in hectares. The symbol for hectare is ha. You may think that this is a funny symbol, but to a farmer this is no laughing matter.

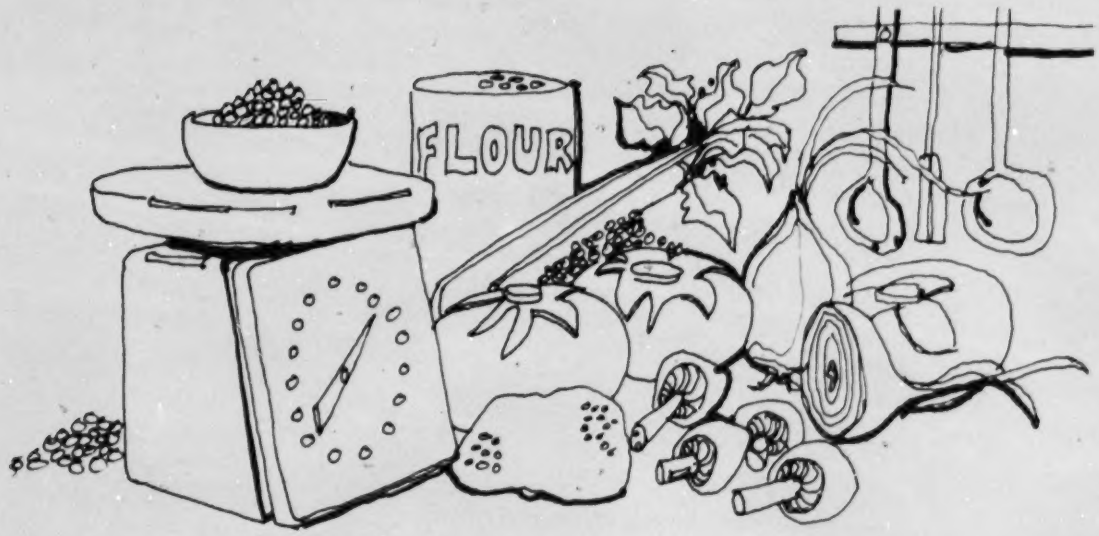


MASS

KILOGRAMS

In this picture you see a scale. A scale is used to measure the weight or mass of things. You might want to find the weight or mass of the foods in the picture. The mass of an object is a measure of the amount of matter in the object. This amount is always the same unless you add or subtract some matter from the object. Weight is the term most people use when they mean mass. Weight is affected by gravity; mass is not. The weight of someone on earth might be 120 pounds; his weight on the moon would be 20 pounds. But, his mass on earth and on the moon would be the same. The metric system does not measure weight--it measures mass. We will use the term mass for the rest of this workbook.

Kilograms are used to find the mass of heavy things. The symbol for kilograms is kg. You write 48 kg for 48 kilograms.



Doing Metric Activities

Activity 21. FIND YOUR MASS

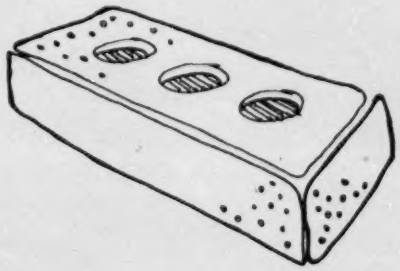
Use the bathroom scale to find your mass. What is your mass in kilograms?

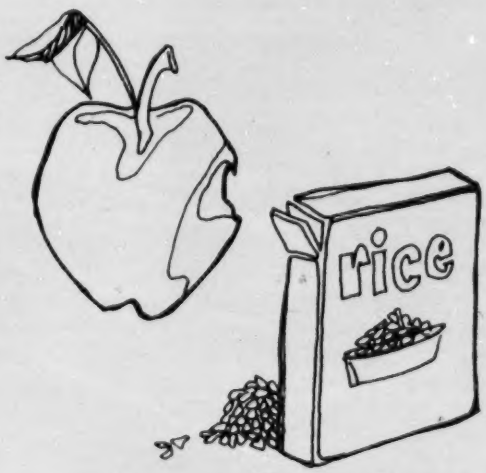
Activity 22. KILOGRAMS

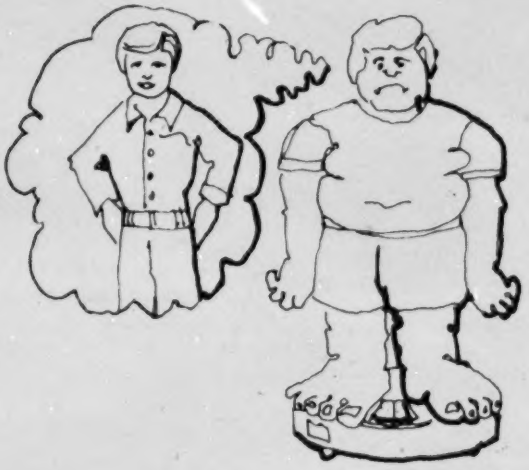
Pick up one of the kilogram mass pieces on the resource table. Get a feel for its mass. Pick up two kilogram mass pieces in the other hand. Can you tell that the mass that you are holding in one hand is more than in the other hand?

Activity 23. WHAT'S ITS MASS?

Pick up some of the heavy objects on the table. What is the mass of the brick? Guess! Write your guess on a sheet of paper. What about the box of rice? What is its mass? Guess! The apple? Now use the kilogram scale to find the mass of each of these. How close was your guess to the real mass?





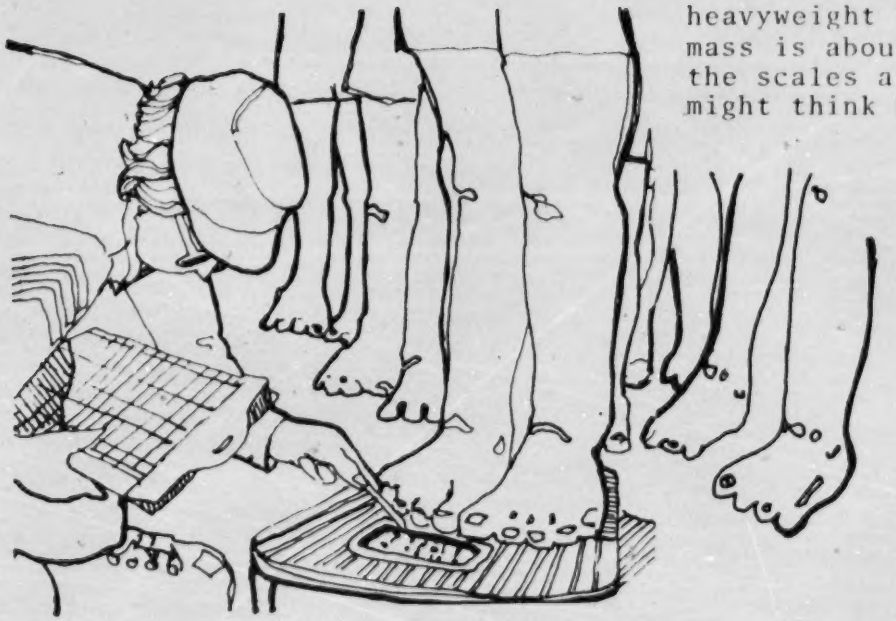


Using Metrics at Work and at Home

What are some things whose mass you might want to find? What are some jobs where you will need to find the mass of things? As you look at the examples that follow, think of some other things and places where you would use mass.

Here is a picture of a man standing on a scale. He is not very happy. His mass is too much. (You might say that he is massive!) He keeps thinking of what he will look like if he can lower his mass.

When you find a person's mass, you use kilograms. In this picture some army recruits are having their masses measured. The mass of each one will be in kilograms. An average woman has a mass of 50 or 55 kilograms. An average man has a mass of 80 or 90 kilograms. A heavyweight boxer's best fighting mass is about 100 kg. If he tips the scales at 106 kg, his trainer might think he is too fat.



We know that the mass of people is given in kilograms. What else? Look at the picture of the grocery store. Here is a clerk making a display of coffee cans. Each can has a mass of 1 kg. What else in the picture comes in kilograms? Sugar, flour, and potatoes are some of the things in a store that come in kilograms.

When someone buys nails, that person often buys them by the kilogram. In this picture, a person is buying 2 kg of nails. The hardware store clerk is measuring out 2 kg of nails on the kilogram scale. What else in the hardware store would come in kilograms?

GRAMS

We often want to find the mass of something that is less than one kilogram. In Activity 23, is the mass of the apple a kilogram? Probably not. What is its mass? We need to have a unit of mass that is smaller than a kilogram. In the metric system we use the gram. The symbol g is used for grams.

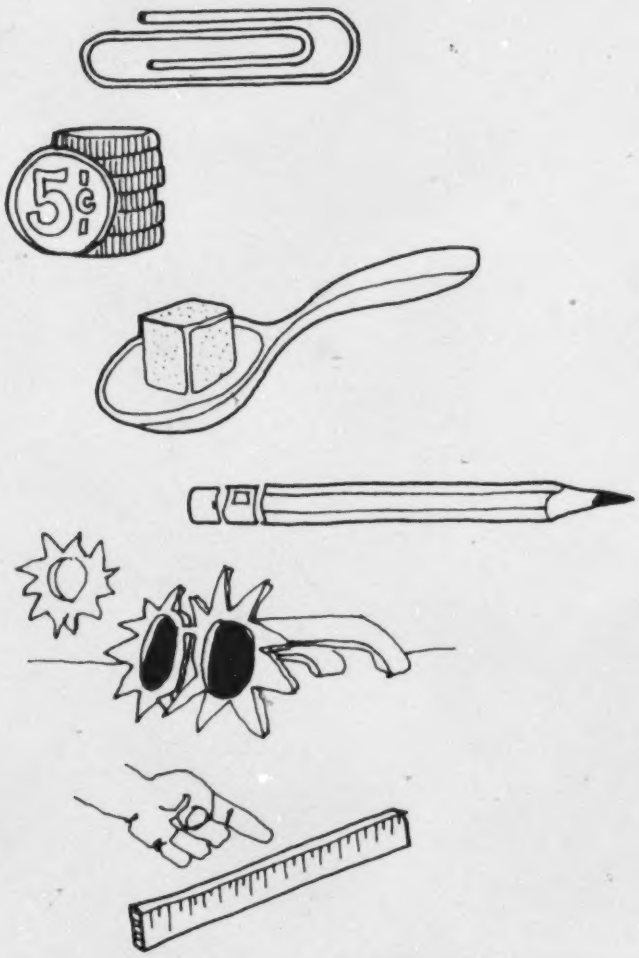
Doing Metric Activities

Activity 24. GRAMS, GRAMS, GRAMS

Go to the resource table. Pick up a 1 g (1 gram) mass piece. Put 2 g in your other hand. Can you tell the difference? Put these mass pieces back on the table. Get a partner, close your eyes, and have your partner put 5 g in one of your hands and 10 g in the other hand. Can you tell which hand has the 5 grams and which has the 10 grams? Keep your eyes closed. Have your partner put some mass pieces in one hand. Try to guess the mass. After several turns trade places and you put the mass pieces in your partner's hand. Let your partner guess the mass.

Activity 25. GUESS AND FIND THE MASS

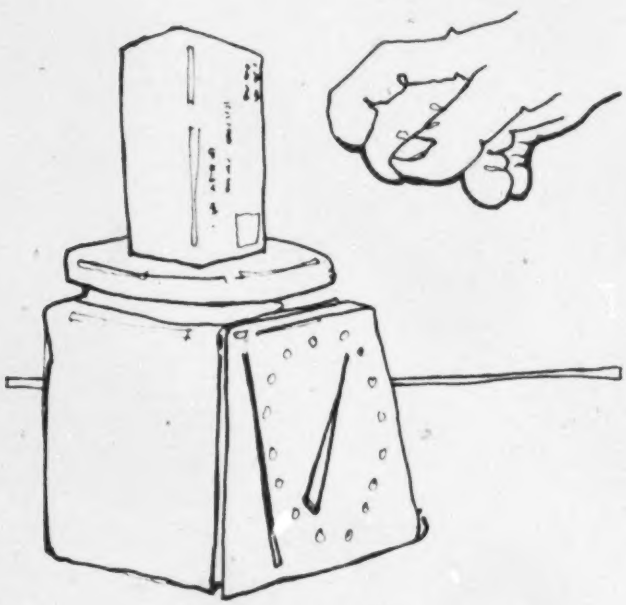
On the resource table are some small objects: paper clip, nickel, sugar cube, pencil, sunglasses, and metric ruler. Guess the mass of each object. Write your guesses on a sheet of paper. (Remember to use g for grams when you write your guess.) Now find the exact mass of the objects. How close are your guesses? Find some other objects. First guess their masses and then measure them.



Using Metrics at Work

Who uses grams? This person is a child care aide. These aides often buy paint and other supplies in powdered form. In the picture the aide is mixing some paint. The paint comes in a 250 g container.

When you go to the post office to mail an envelope or a small package, the postal clerk will find its mass in grams. A gram scale is used to find the mass. If you bring a heavy package to the post office, the postal clerk might need to use a kilogram scale. Post office workers need to know how to use both a kilogram scale and a gram scale.



GRAMS--KILOGRAMS

There are 1000 grams in one kilogram. This means that 2000 grams is the same as 2 kg, 3000 grams is the same as 3 kg, 4000 g is the same as 4 kg, 5000 g is the same as 5 kg, 12 000 g is the same as 12 kg, and so on.

What if you have something with a mass of 14 kg? How many grams is this? Again

1 kg = 1000 g
2 kg = 2000 g
3 kg = 3000 g
4 kg = 4000 g
9 kg = 9000 g
10 kg = 10 000 g

And so,

14 kg = 14 000 g

Now you try some. Complete the chart on this page. When you have finished, check your answers with the answers on page 60.

kg kilograms	g grams
1	1000
2	
3	
	4000
37	37 000
46	
	78 000

Doing Metric Activities

Activity 26. WHAT WE EAT

Look at boxes, cans, and sacks of food. What is the mass of each one? Look at light and heavy things. If you can, bring some to class. Empty the box, can, or sack and find the mass of the contents. Was the label right?

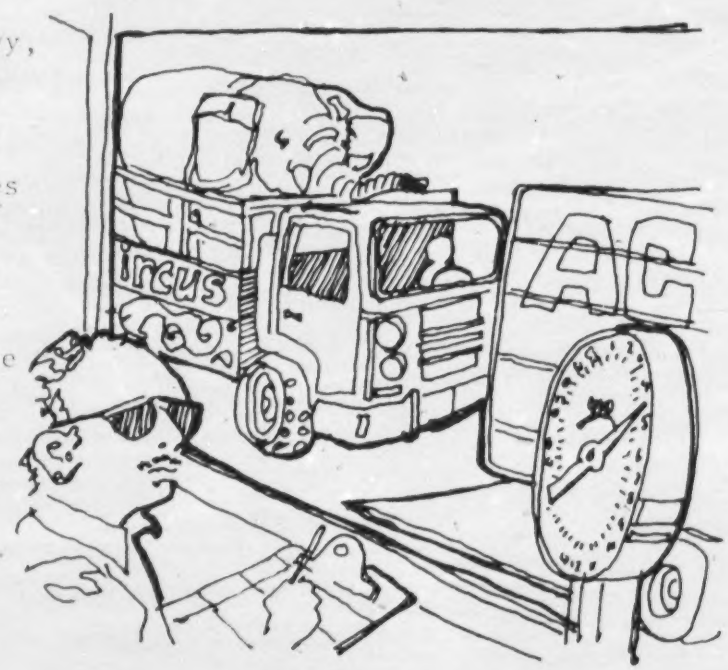
Activity 27. THINK MASS

Who do you know that has to find the mass of things when they work? Do they use a gram scale or a kilogram scale? What other jobs are there where the masses of things are measured? Talk about it.

METRIC TONS

When someone has to find the mass of something that is very heavy, that person uses a metric ton. A metric ton is 1000 kilograms. The symbol t is used for metric ton.

What kind of things have masses in metric tons? Large shipments of things like corn and wheat are in metric tons. Other things with masses in metric tons are trucks, large animals such as elephants, and airplanes. An elephant can have a mass of up to 6 metric tons.



CAPACITY

LITRES

We measure things like water, milk, and cooking oil by pouring them into measuring cups. We measure such things as salt and sugar in the same way. We buy oil, gasoline, or paint by the container. Containers come in different sizes. Each size tells us how much the container holds.

One of the units that are used to find out how much something holds is the litre. The symbol l is used for litres. If you have 25 litres, you would write 25 l. Make sure that you put in the space so that it does not look like 251. If you think that someone might not know what you mean, write the entire word litre. The Doing Metric Activities section will help you get a feeling for the size of a litre.

Doing Metric Activities

Activity 28. LOTS OF LITRES

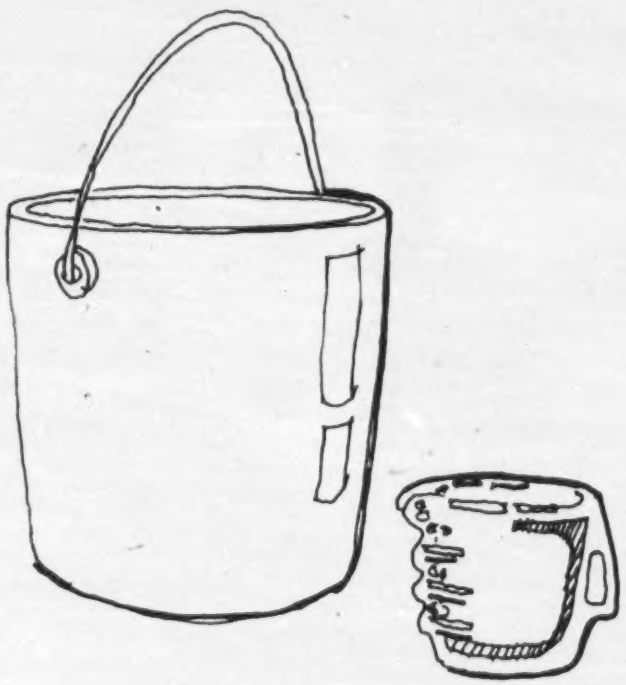
Go to the resource table. Here you will find some things that hold one litre. Pick one up; turn it around; get a feel for how big it is. Fill it with rice, sand, flour, sugar, water, and so on. Are there any boxes, cans, bottles, or sacks that say they hold a litre? If so, pour everything out of one of these into the litre measuring cup. Is it really a litre?

Activity 29. GUESS LITRES

Go to the resource table. You should find a paper cup, juice glass, can of soft drink, casserole dish, and frying pan. How many litres do each of these hold? Guess! Write down your guesses on a sheet of paper. Now use the litre cup and check your guesses. Check with other people in class.

Activity 30. FILL THE BUCKET

Get a bucket and a litre measuring cup. How many litres will the bucket hold? Guess! Fill the litre cup with water. Pour the water in the bucket. On the bucket, mark the height of the water with a waterproof marker. Fill the cup again, pour the water in the bucket, and make a new mark. Keep doing this until the bucket is full. How many litres did the bucket hold? How close is your guess?



Using Metrics at Work and at Home

This man knows that his baby is hungry. He has gone to the refrigerator to get some milk. He is taking a litre of milk out of the refrigerator. Milk comes in litres. You use litres to measure large amounts of liquid.

The baker is using a litre cup to measure the sugar for his recipe. When you cook with sugar you will use litres or parts of litres. You will use a litre cup to measure sugar.

This woman is buying some paint. The cans are in litres. Paint will be sold in one litre, two litre, and four litre cans.

Milk, paint, and sugar are just a few of the things you will use in litres. Some other things that will come in litres are gas and oil for a car, soft drinks, beer and wine.

MILLILITRES

There are times when a litre is too big. A smaller size for measuring water, milk, sugar, and so on is a millilitre. There are 1000 millilitres in one litre. The symbol for millilitre is ml. 37 ml means 37 millilitres. You will measure millilitres with either millilitre spoons or small measuring cups.

Doing Metric Activities

Activity 31. SPOONS

On the resource table are some millilitre measuring spoons and some medicine bottles. How many millilitres does each bottle hold? Use the spoons to find out. How do you know how much each spoon holds? Can you think of any other places you would use millilitre spoons? Talk about some of the places with other students.

Activity 32. COFFEE BREAK

With the help of the other students make a pot of coffee. If you have enough coffee drinkers, use 2 litres of water and eight 15 ml spoons of coffee. Use the millilitre spoons for the sugar and cream. How many millilitres of sugar and cream do you take in your coffee?

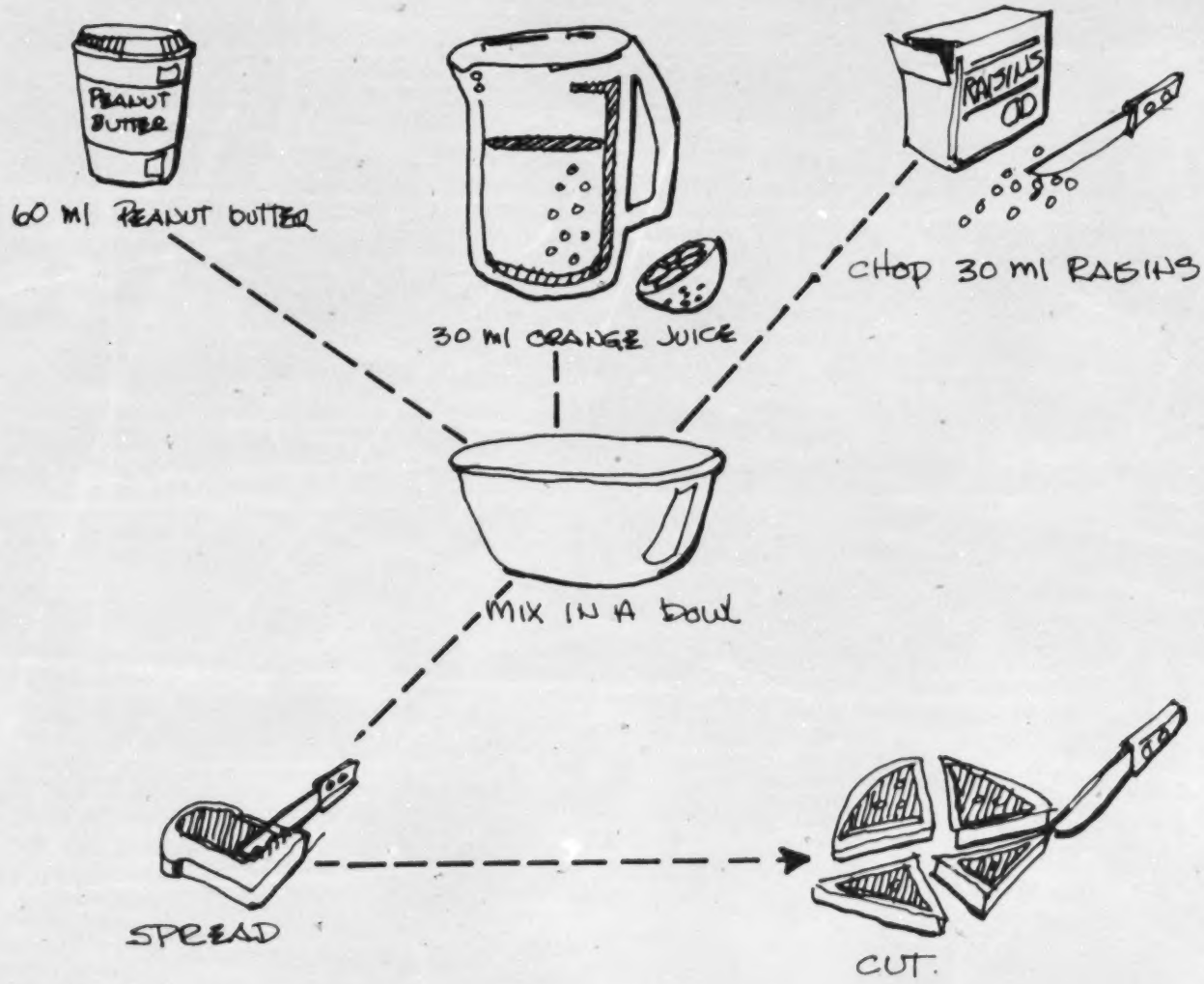
Activity 33. CAN CAN

On the table are some cans. How many millilitres does each can hold? Mark your answer on a sheet of paper. If each person could eat 200 ml, how many people would each can serve?

Activity 34. LET'S EAT

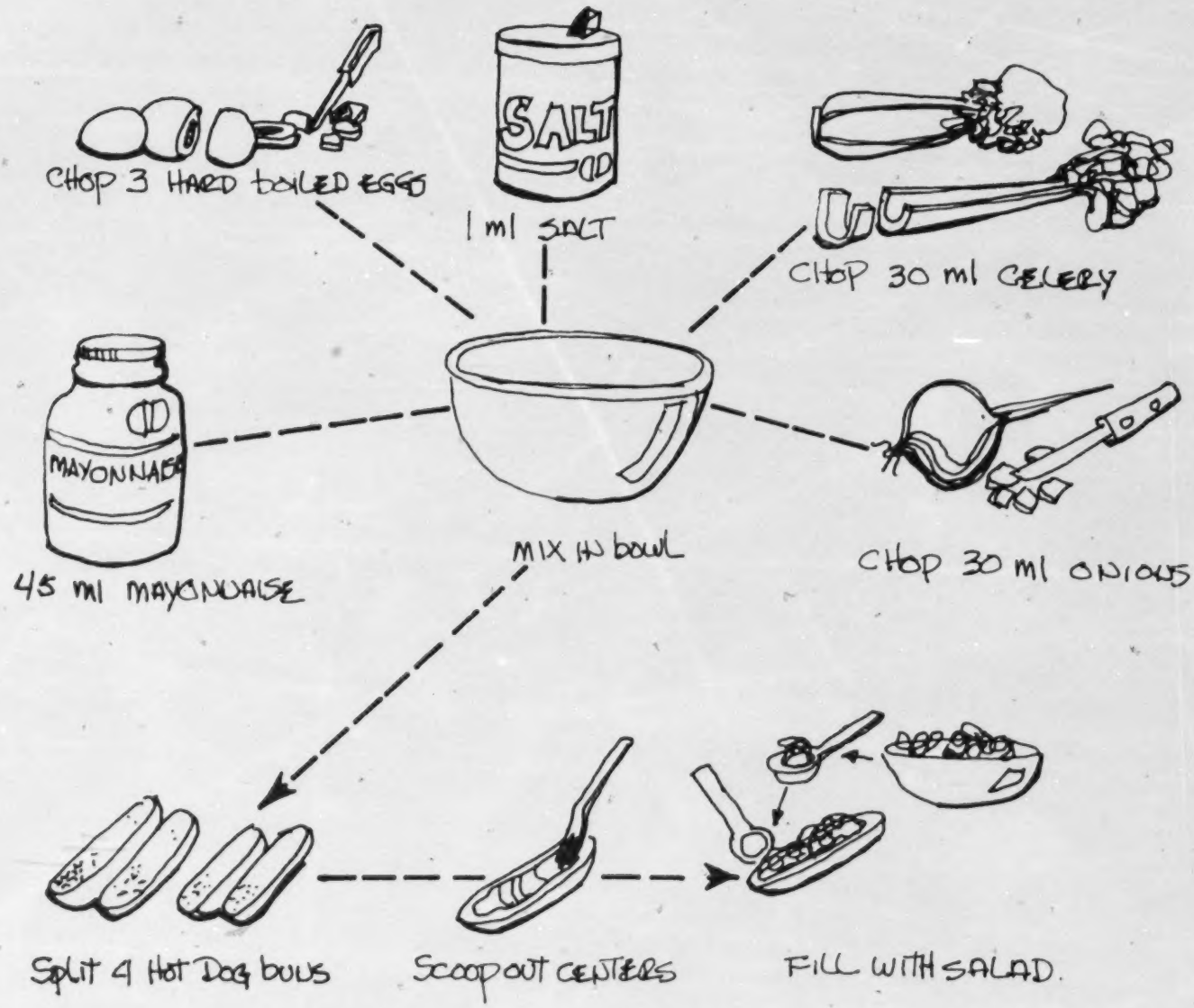
On the next four pages are four recipes. With the help of the rest of the class, fix each recipe.

Millispread for Bread



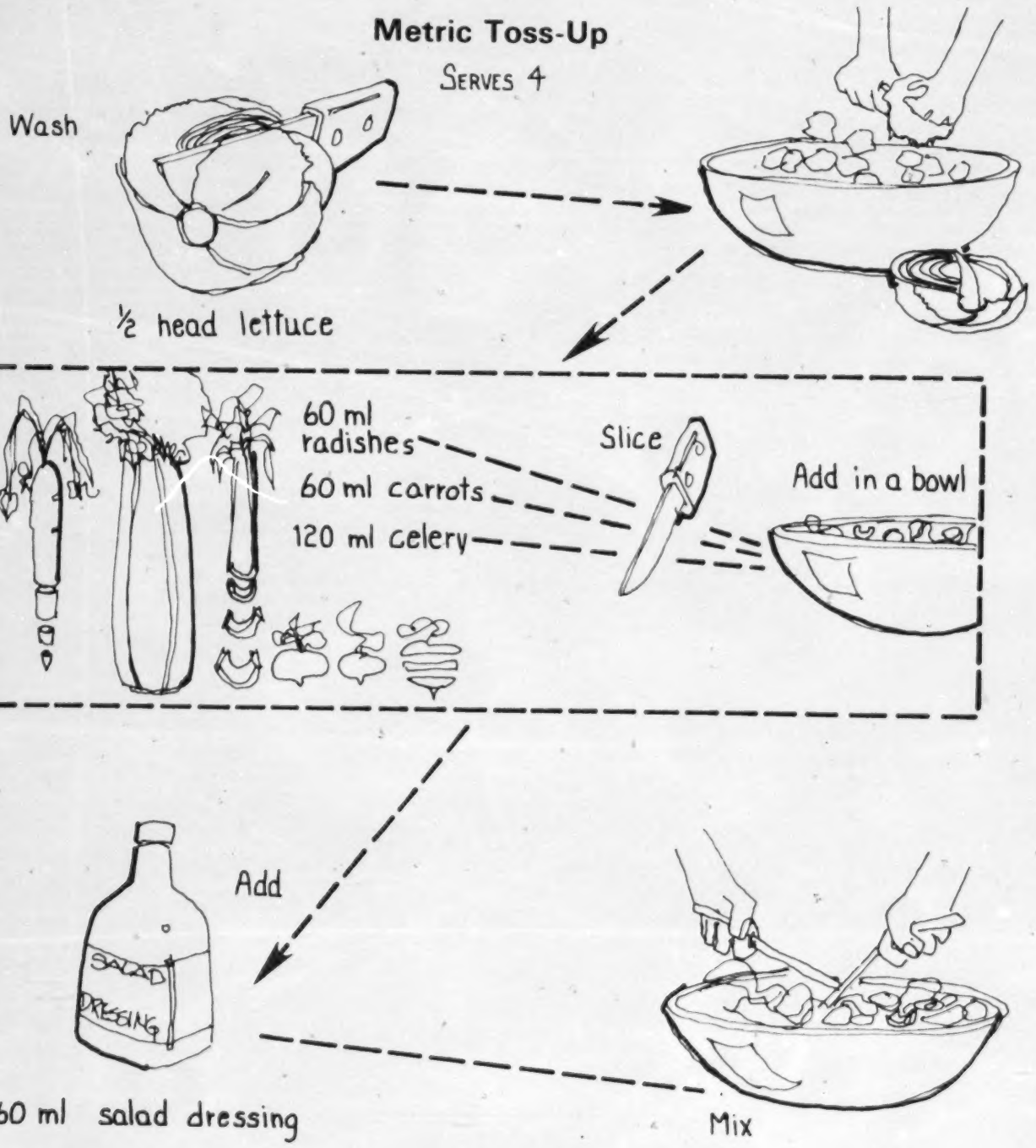
Metric Egg Salad

MAKES 8 SANDWICHES



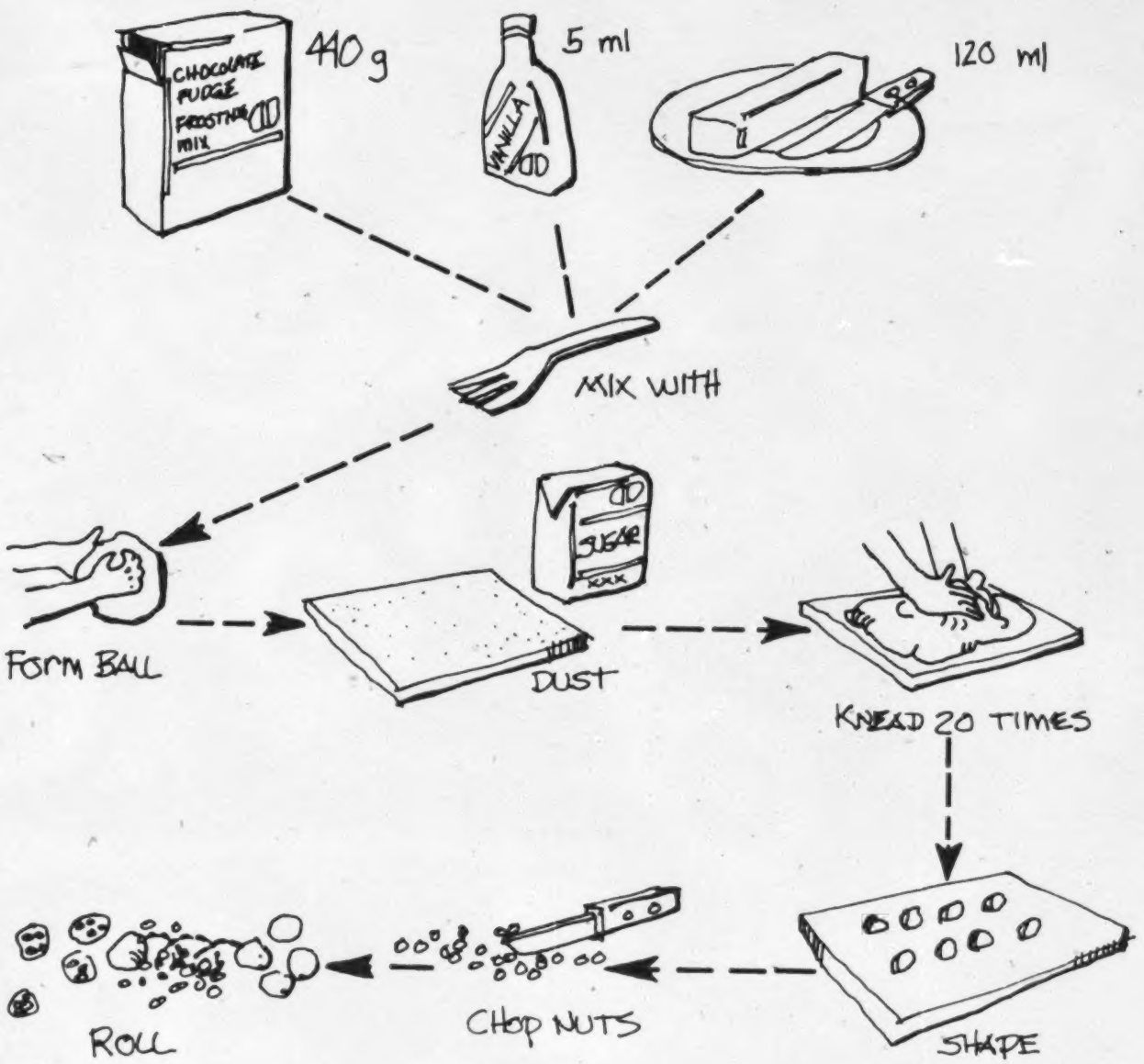
Metric Toss-Up

SERVES 4



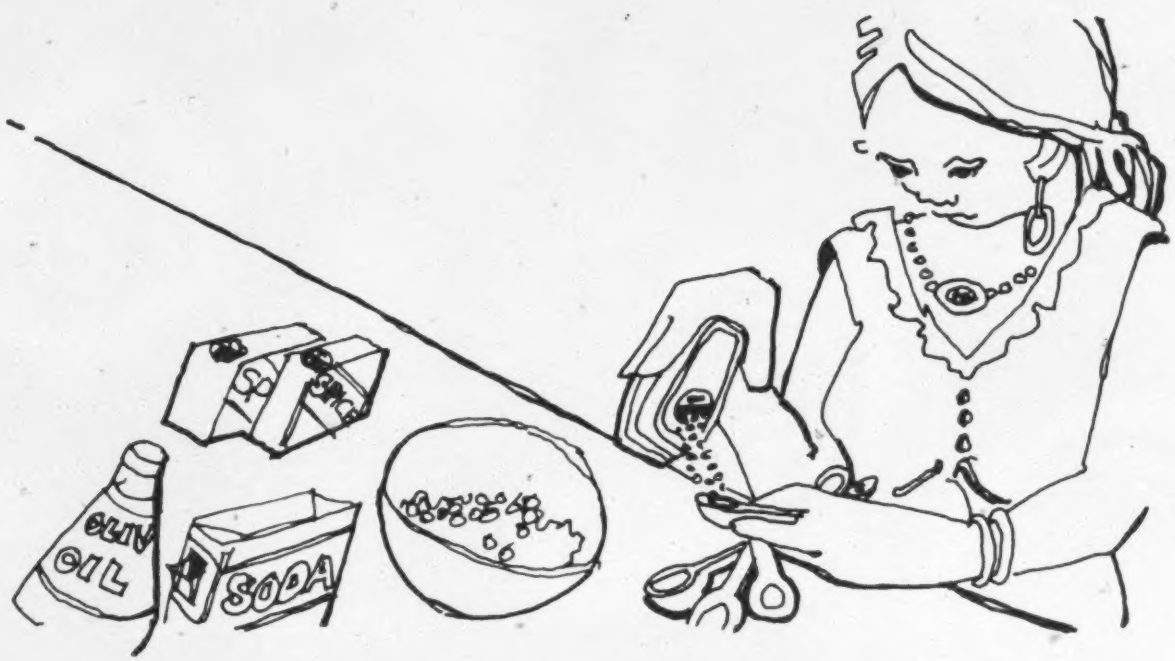
Fudge Metribites

MAKES 48 BITES



Using Metrics at Work and at Home

This woman is cooking. She is measuring the amount of salt that she needs with a millilitre spoon. What else does she measure in millilitres? Look at the picture! Some of the things are baking soda, olive oil and spices.



You would use millilitres for more than cooking. The man in this picture is giving his child medicine. He is using a 5 ml spoon.

What are some other places where you might use millilitres? Some things come in packages that are marked in millilitres. Small amounts of milk come in 100 ml and 500 ml sizes; beer comes in 340 ml and 625 ml sizes; shampoo comes in 25 ml and 50 ml sizes.

Who else needs to know how to measure in litres or millilitres? With the rest of your class, can you think of other jobs where people have to use millilitres?

LITRES-MILLILITRES

There are 1000 millilitres in one litre. This means that

2000 ml is the same as 2 litres
3000 ml is the same as 3 litres
4000 ml is the same as 4 litres
5000 ml is the same as 5 litres
13 000 ml is the same as 13 litres

and so on.

What if you had something that held 14 litres? How many millilitres is this? Again

1 litre = 1000 ml
2 litres = 2000 ml
3 litres = 3000 ml
9 litres = 9000 ml
10 litres = 10 000 ml.

And so,

14 litres = 14 000 ml

Now you try some. Complete the chart below. When you have finished, turn to page 61 and check your answers.

l litres	ml millilitres
1	1000
2	
3	
4	
	5000
	7000
10	10 000
12	
	17 000
38	
	42 000
74	
	96 000

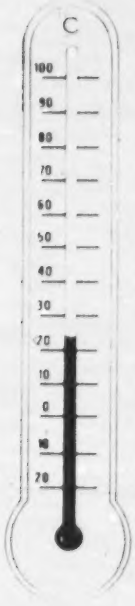
TEMPERATURE

DEGREES CELSIUS

Thermometers are used to measure temperature. For example, we often want to know the temperature of persons, of rooms, of ovens, of the outdoors.

The metric thermometer is called a Celsius thermometer. It was named after the man who created it, Anders Celsius.

Temperatures are given in degrees Celsius (°C). Water boils at about 100°C (100 degrees Celsius). It freezes at about 0°C (zero degrees Celsius). A normal body temperature is about 37°C.



Doing Metric Activities

Activity 35. READING DEGREES

Your teacher will use the Celsius demonstration thermometer and show you how to read it.

Activity 36. TAKING TEMPERATURES

You will find some thermometers and some cans of water on the resource table. Some water will be very hot and some will be very cold. Use the thermometer and find out how hot or cold each can of water is. Write down your answer. Did everyone in the class get the same answer? Why? How cold was the ice water? How hot was the boiling water?

Activity 37. AROUND AND ABOUT

Take the temperature of the room at several places:

Near the window. Near the floor.
Near the ceiling. Near the door.
In the middle of the room.

Are the readings all the same? If they are different, can you tell why?

Activity 38. IN AND OUT

Take some temperatures outside.

In the sun. Under a tree.
In a car. Next to the building.
In the shade. Next to a window.

Make sure you stay in each place long enough for the thermometer to change. What is the highest temperature? What is the lowest? How much difference is there between the highest and the lowest?

Activity 39. FEVER

The teacher will show you how to read a clinical Celsius demonstration thermometer. How is a normal temperature shown on the thermometer? When does someone have a fever? What is a high temperature?

Activity 40. BODY TEMP

Use one of the clinical thermometers and take your temperature. Is your temperature 37°C?

Using Metrics at Work and at Home

When someone is sick, you can take that person's temperature with a thermometer. The temperature reading will tell if you need to call the doctor. The man in the picture is taking his child's temperature.

A person who is not sick will have a temperature of about 37°C. If their temperature is 39°C or higher, they are pretty sick.

You also use degrees Celsius in cooking and baking. When you use the oven you need to set the correct temperature. Cakes and cookies are baked at around 170°C. Bread is baked at 200°C. A very slow oven would be 120°C. A hot oven is 210°C, and a very hot oven is about 240°C. When cooking candy the thermometer should read 120°C.

The man in the picture just got a heating bill. It is cold outside and hot inside. One look at the Celsius thermometer tells him just how hot it is. What can he do to make the room cooler? Would that save him money?

People who install heating and cooling systems in homes and businesses use thermometers. People in nursing and medicine use thermometers. People who work in animal clinics also use thermometers. People who work in plant nurseries use thermometers. Can you think of other kinds of jobs where using thermometers is important?

* * * *

You have now finished this workbook. As you have gone through this book you have read about the metric system, you have used the metric system, and you have read about people using the metric system at home and at work. You are now ready to use the metric system at home, at work, and at play.

ANSWERS

Page 6

There are 10 decimetres in one metre.

Page 7

There are 10 centimetres in one decimetre.

There are 100 centimetres in one metre.

Page 16 Activity 16.

100 mm = 10 cm

120 mm = 12 cm

Page 38

kg kilograms	g grams
1	1000
2	2000
3	3000
4	4000
37	37 000
46	46 000
78	78 000

Page 53

l litres	ml millilitres
1	1000
2	2000
3	3000
4	4000
5	5000
7	7000
10	10 000
12	12 000
17	17 000
38	38 000
42	42 000
74	74 000
96	96 000

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